Annex 2

Assessment of Surface Water Flood Risk Priorities

Overview

Surface water flood risk mapping products are available at a national level, the Environment Agency has produced three generations of mapping products with the latest – the updated flood map for surface water – being the one used for this assessment.

The flood map for fluvial and tidal risks has been available since 1999 and has developed over the years to incorporate a high level of detail and accuracy and is accepted as a very good assessment, albeit at a national level, of these risks. The surface water flood map has only been available for the last few years and unlike the tried and tested modelling approaches in its sister map the techniques needed to accurately assess surface water are still evolving.

Unlike fluvial flooding where models can accurately predict the volume and timing of the rainfall that makes its way into rivers and streams and pass downstream, the interaction of a dense urban environment made up of a myriad of hard and soft, engineered and natural surfaces raises very difficult problems for modellers.

The loss of rainfall volumes into the receiving drainage systems have to be approximated at regional and national levels and interactions of localised structures that can train, block or enhance the depth or extent of surface water flooding need to be further considered at a large scale. Many of these structures have been included where they can easily be identified – railway embankments, bridge abutments etc but at the localised scale of surface water flooding the interaction of roadside curbs or speed cushions can affect the distribution of localised risk.

However, such detailed modelling is costly and requires considerable computing time to produce, therefore the national scale maps are seen as a good level of detail for assessment such as this and the mapping is found to correlate well with our known areas of surface water flood risk.

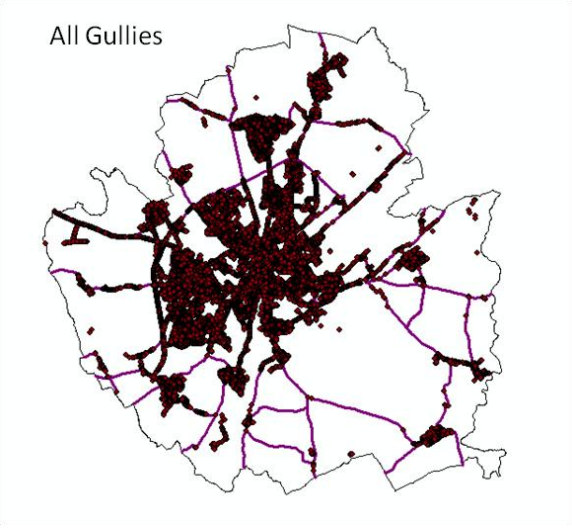
Methodology

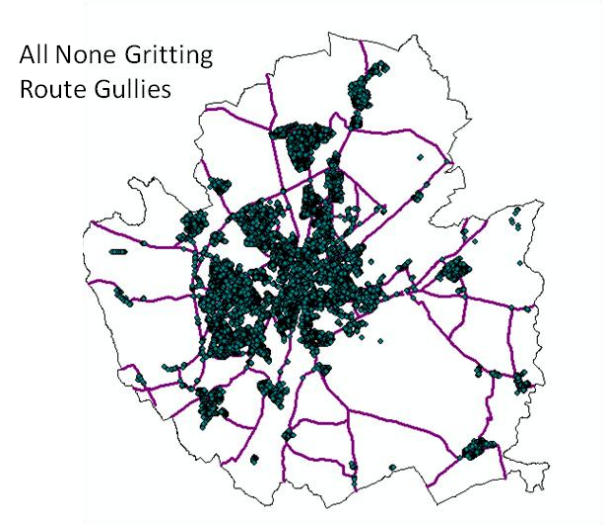
The mapping outputs from the Flood Map for Surface Water have been utilised and individual data layers for the 1 in 30 year storm have been extracted utilising ArcGIS, the CYC gulley layer was overlaid by the CYC gritting route layer and all gullies lining the gritting route were removed from the main gulley layer leaving a layer that contained all of the gulley assets that are currently cleansed on a reactive basis.

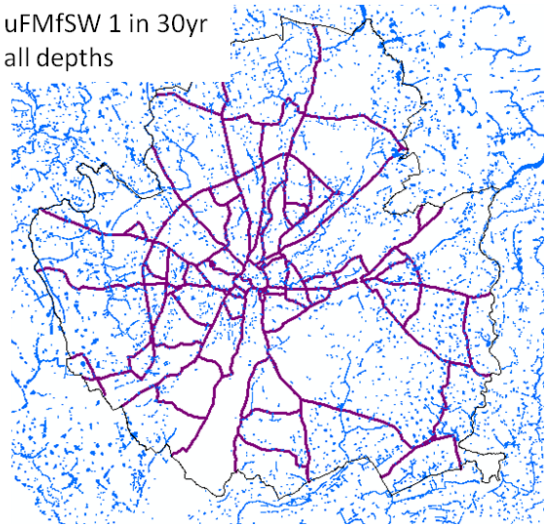
The flood map outputs were cropped to include only those areas where the depth of flooding was shown to be greater than 300mm, an assumption is made that any flooding of lower depths is contained within the highway or other features and does not lead to flooding away from the highway.

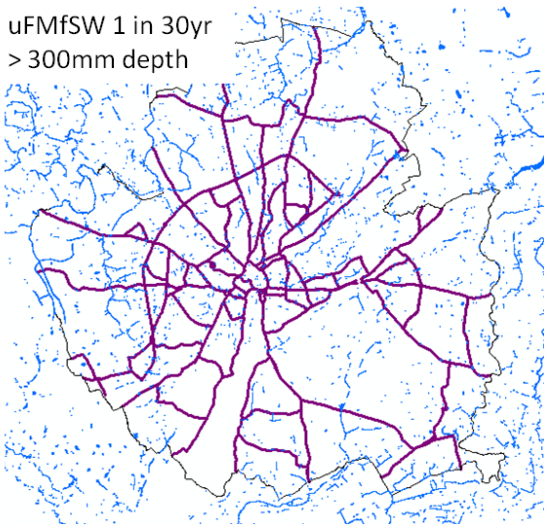
The 300mm depth of flooding is assumed to be of such a height that it could pass from the highway and where the flood outlines interact with the curtilage of a property – through interpretation of the CYC GIS property layer – an assumption is made that the flood level could be above the threshold of the property and flood damage could be caused.

The process is shown in the below figures:

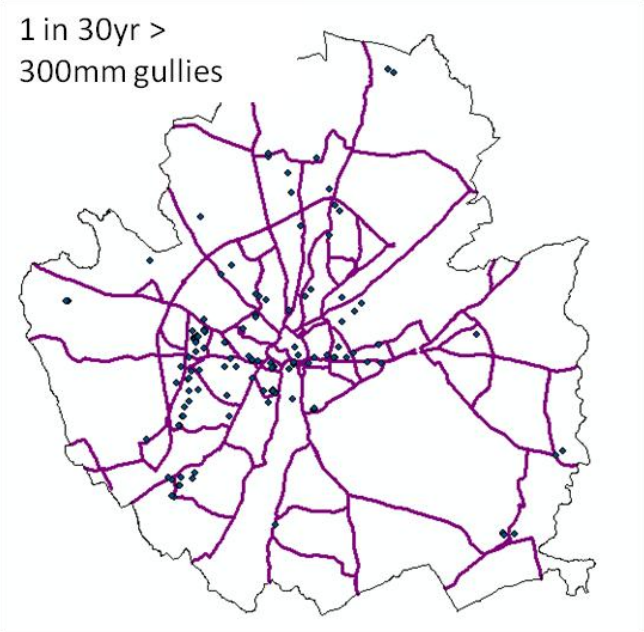








The streets with properties identified as being at risk were further considered and an assessment was made to identify the number of gullies in the street that would need to be cleansed and also the gullies in the connecting streets along the drainage network that would further require cleansing to release pressure on the flood risk areas.



Conclusions

An assessment of surface water flood mapping products has identified properties in 53 streets that are theoretically at risk of surface water flooding in the 1 in 30 year storm event.

For storm events of a greater magnitude there is the potential for this area of risk to be greater but as this would represent a storm that would exceed the design capacity of a standard drainage network this has not been considered as part of this assessment.

Similarly, drainage features in other areas of the city could present an increased surface water risk to properties where they are inadequately maintained and ineffective due to blockage or partial blockage, this assessment is therefore only a theoretical assessment of the likely areas of hydraulic vulnerability across the network and does not take the condition of the gulley asset into consideration.